# SOUTHERN AFRICA: FOOD SECURITY POLICY OPTIONS

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# MARKET LIBERALISATION AND FOOD SECURITY IN MALAWI

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## INTRODUCTION

Since independence, Malawi has emphasised the smallholder and estate sectors. They differ in terms of land tenure, type of crops grown, credit institutions, market access, and availability of extension service rather than in farm size. Farmers under communal land tenure cannot grow burley tobacco, are serviced by the Agricultural Development and Marketing Corporation (ADMARC), and have access to government extension services. On the other hand, estate farmers under freehold or leasehold can obtain commercial bank credit. Hence, the smallholder sector produces food and a limited number of export crops while the estate sector has concentrated on tobacco, tea, and sugar.

During the 1960s and 1970s, estate production grew much faster than smallholder output. Exports from estates expanded at an annual rate of 15% while smallholder exports recorded very little growth. The estate's share of exports increased from 32% in 1967 to 65% in 1979 and reached 80% in 1981-82.

### Emerging problems

In the late 1970s and early 1980s, significant problems emerged. Malawi's terms of trade fell by 40%. Agricultural production suffered from drought, falling export volume, and required maize imports for the first time in virtually a decade. In addition, disruption of the transport system through Mozambique forced Malawi to use more costly alternative routes.

The primary causes of Malawi's economic difficulties were transport problems and serious deterioration in the country's terms of trade. Yet, the crisis also revealed important weaknesses in the economy and in the agricultural development strategy. Malawi's exports are heavily concentrated on the three estate-produced commodities. Unfortunately, each commodity faces uncertain supply and demand growth prospects for the following reasons:

- o A shortage of suitable land severely limits any increase in output from extended acreage. Expansion will have to come from higher yields.

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- o A growing shortage of fuelwood threatens flue-cured tobacco and tea production.
- o A shortage of credit may become a serious constraint to expanding burley and flue-cured tobacco production.
- o World market prospects for tobacco, tea, and sugar are poor.
- o During the recent past, expanded maize production has made a substantial contribution to growth, but high transport costs and low market price limit prospects for exporting maize.

**Government's response**

Due to these and other problems, government has put added emphasis on smallholder food production. During the past six years, the government has taken significant steps to improve the agricultural marketing and pricing environment; particularly improving the methods of setting agricultural prices in order to increase smallholder returns and improve incentives for production and diversification.

ADMARC's operations were also improved by introducing a new management structure, rationalizing its investments through swaps with other large corporations, and drawing up of comprehensive divestiture and operational plans. Fertilizer procurement and distribution were strengthened and a four-year phase-out of the fertilizer subsidy was implemented.

The rest of our discussion emphasises the smallholder sector for two reasons. First, since this sector is the main producer of food crops, any analysis of market liberalisation and food security must therefore concentrate on it. Second, the estate sector is already liberalised since it trades directly on world markets.

## MAIZE PRICING POLICY

**History of controlled marketing**

Over the past 40 years, five different institutions have been created to organise agricultural marketing in Malawi.

The Maize Control Board

The origin of official control over food marketing can be traced to 1949 when, in response to a drought, 23,608 mt of famine relief food (over half of it maize) were imported. In that year, the Maize Control Board was established to control the marketing of maize grown on trust lands and to set a guaranteed price. Although this price was one penny per pound for a fairly long time (1949 to 1956), it significantly increased the importance of maize production as a cash crop, especially in the Central Region.

The Produce Marketing Board

In 1952 the Maize Control Board was superseded by the Produce Marketing Board (PMB). It was given wider powers, including authority to purchase other crops such as groundnuts and beans. Maize and nonmaize purchases continued to grow through 1954, followed by a decline in 1955-56. Since surpluses were exported to Europe, falling world prices in the late 1950s led to a reduction of the maize producer price to 0.67 pence per pound in 1957. Interestingly, the price fall led to an increase in private trading activities and an immediate reduction in the quantity of grain offered to the board; from 29,056 mt in 1956 to only 4,903 mt in 1957 (British Government, 1959). The deficiency forced the board to purchase additional quantities from private traders at higher prices.

The Agricultural Production and Marketing Board

The price drop was instituted by the Agricultural Production and Marketing Board (APMB), a 1956 amalgamation of the PMB, the Native Tobacco Marketing Board, and the Cotton Marketing Board. The APMB was given the task of providing a stable and efficient marketing system for the main cash crops produced on trust lands. In addition to its marketing function, the board was charged with providing extension advice during the growing season.

Through 1956, official policy was to pay growers a price that provided a "reasonable return". Price policy changed in 1957 when minimum uniform preplanting prices were implemented. Producer prices were intended to be related to world market prices. Stabilisation around a market trend line was to be accomplished through a buffer stock. The board promised to purchase all produce offered at the official price. The board's primary purpose was to act as the government's agent in supplying industrial and urban markets and in maintaining a strategic reserve against the possibility of crop failure.

The Farmer Marketing Board

APMB was succeeded by yet another statutory body, the Farmers Marketing Board (FMB). The functions of the new board were more extensive than its predecessors. It was responsible for:

- marketing, processing, and disposing of agricultural products;
- providing adequate price stability in order to protect farmers from world price fluctuations and increased agricultural output;
- providing storage facilities for food reserves on behalf of government; and
- subsidising agricultural inputs to increase yields.

Agricultural Development and Marketing Corporation

In 1971 the Agricultural Development and Marketing Corporation (ADMARC) assumed FMB's responsibilities. By this time, the board had accumulated 52 principal storage depots throughout the country and hundreds of temporary bush markets. According to the *Agricultural Development and Marketing Corporation Act of 1971* (Ch. 67.03 Section 5), ADMARC's objectives were similar to its predecessor's. The difference was that ADMARC was to take a more aggressive role in supporting agriculture. Specifically, the new board was charged with buying, storing, processing, adapting for sale, distributing, insuring, advertising, and transporting all products grown on customary lands for sale. In addition, the act mandated the corporation to sell produce for domestic consumption at prices that covered marketing costs; except when the government felt that a lower price was in the national interest. At any rate, government would reimburse ADMARC for the difference between the low price and the cost recovery price.

**Impact of price levels**

Actually, the selling prices have nearly always been below cost recovery levels. Consumer-producer price differences have been insufficient to cover marketing costs, especially the cost of transporting produce from rural markets to urban centres (Table 1). Maize has incurred losses in most years because of the subsidy policy, as indicated by net profits/losses on crops traded (Table 2).

Because cash crops are exported at world prices, Malawi's rural population has paid what Kydd and Christiansen (1982) have called an implicit tax (Table 2). Recently trading profits in tobacco and groundnuts have exceeded losses in maize and rice. The latter losses are incurred principally due to subsiding workers paid low wages in urban areas.

**Private trading**

Private trade in commodities produced by smallholders preceded official marketing institutions and has always been accepted. Rules have been established restricting activities of large and non-African traders, including upper limits on quantities of produce a single trader may purchase. Little information has been gathered about the private marketing subsystem, except that the Ministry of Agriculture and the National Statistical Office collect price-related and private trader information at a very limited number of localities.

Status of African traders

The *APMB Ordinance of 1957* exempted African traders from restrictions against trading produce with fellow Africans. However, since margins

Table 1. Maize prices, 1967-68 to 1986-87. Malawi[a]

| Year | Free market price[b] | ADMARC | |
|---|---|---|---|
| | | Producer price | Consumer price |
| 1967-68 | 39.70 | 20.00 | 40.00 |
| 1968-69 | 40.50 | 20.00 | 40.00 |
| 1969-70 | 52.70 | 20.00 | 40.00 |
| 1970-71 | 45.10 | 30.00 | 40.00 |
| 1971-72 | 48.90 | 30.00 | 40.00 |
| 1972-73 | 48.40 | 30.00 | 40.00 |
| 1973-74 | 64.20 | 30.00 | 50.00 |
| 1974-75 | 83.50 | 40.00 | 66.00 |
| 1975-76 | 91.50 | 50.00 | 66.00 |
| 1976-77 | 85.00 | 50.00 | 66.00 |
| 1977-78 | 86.20 | 50.00 | 66.00 |
| 1978-79 | 94.70 | 50.00 | 90.00 |
| 1979-80 | 122.20 | 66.00 | 90.00 |
| 1980-81 | 155.50 | 66.00 | 110.00 |
| 1981-82 | 162.60 | 111.00 | 130.00 |
| 1982-83 | 190.10 | 111.00 | 140.00 |
| 1983-84 | 196.50 | 122.00 | 140.00 |
| 1984-85 | 195.60 | 122.00 | 140.00 |
| 1985-86 | 246.50 | 122.00 | 148.50 |

[a] Prices are in Kwacha per mt.
[b] The free market price is based on monthly average at Blantyre and Lilongwe Markets.
Source: ADMARC, (various years) and *National Statistical Office*

Table 2. ADMARC net profit/(loss) on crop trading, 1974 to 1985 Malawi[a]

| | Financial year ending 31st March | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Crop | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 |
| Tobacco | 2.56 | 4.91 | 10.61 | 15.76 | 25.86 | 4.22 | 2.71 | 3.23 | 9.14 | 18.62 | 13.36 | 15.73 |
| Cotton | 1.45 | 3.16 | 0.46 | 1.91 | 1.41 | 1.21 | 0.46 | (0.79) | 2.75 | 0.72 | (0.25) | (1.21) |
| Groundnuts | 1.77 | 1.08 | 1.27 | 5.99 | 4.50 | 2.22 | 3.75 | 4.23 | 3.28 | 0.78 | 0.28 | (0.90) |
| General produce | 0.61 | 1.09 | 0.54 | 1.71 | 1.38 | 0.54 | (1.10) | (0.45) | (0.52) | (1.01) | (0.89) | (0.76) |
| Rice | 0.41 | 0.57 | (0.03) | (1.08) | (0.78) | (0.68) | (1.56) | (1.40) | (0.66) | (1.12) | (0.46) | (1.18) |
| Maize | 1.58 | 0.22 | (2.87) | (1.61) | (2.33) | (3.32) | (4.18) | (4.49) | (5.13) | (5.77) | (5.49) | 1.17 |
| Total | 8.11 | 11.03 | 9.98 | 22.68 | 30.04 | 4.19 | 0.08 | 0.33 | 8.86 | 12.22 | 6.55 | 12.85 |

[a]Figures are in millions of Kwacha. Numbers in parentheses indicate losses.
Source: ADMARC (various years).

between producer and consumer prices have been small, it has not been worthwhile for large traders to participate in food marketing. The increase in private maize trade in 1957 following APMB's price reduction indicates the lively state of private trade, even before independence. The *Jack Report* (Federation of Rhodesia and Nyasaland, 1960) welcomed this development, noting that the increased number of middlemen engaged in maize trade would offer competition, reduce excess board profits, and improve farmers' living standards.

**The trading network**

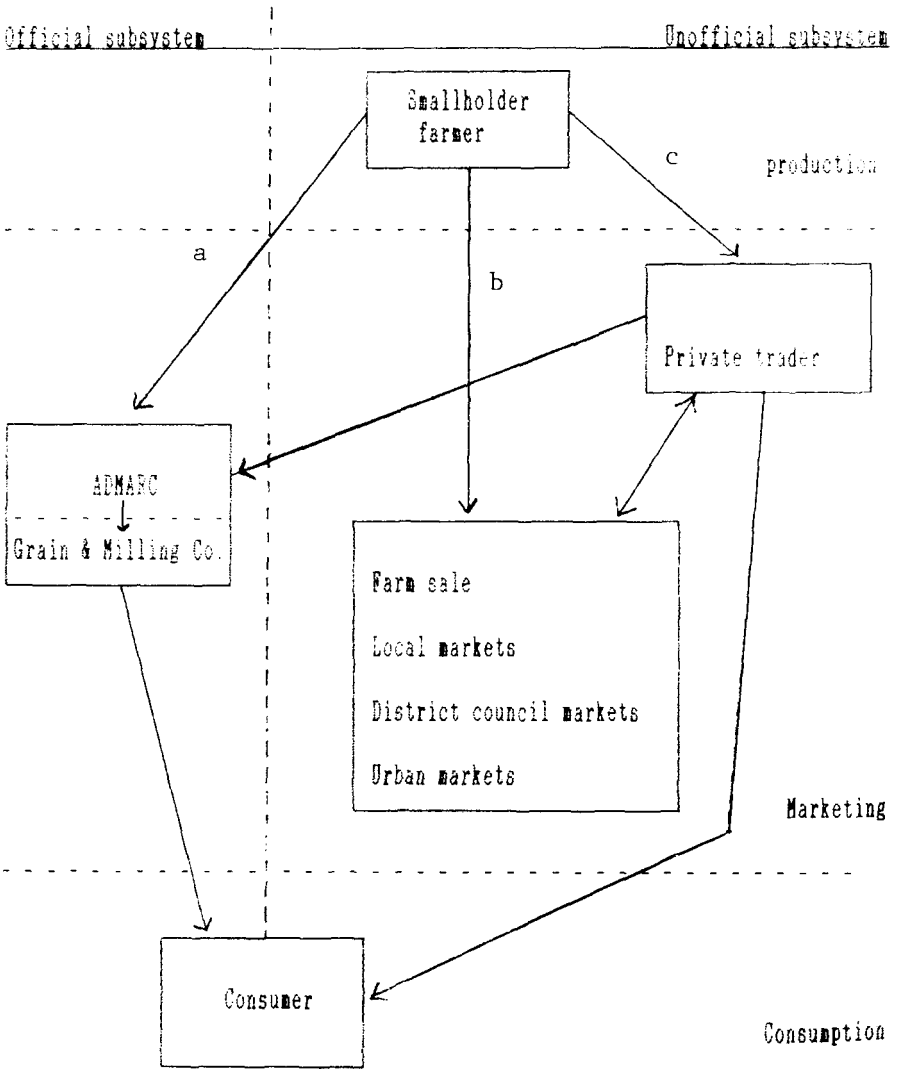
Figure 1 shows the relationships between private trade and the marketing board subsystems in Malawi. Farmers sell maize to ADMARC, consumers, or middlemen. ADMARC may purchase maize grain from middlemen or producers, and may sell to either consumers or the Grain and Milling Company for processing into flour. Maize sold by smallholders to consumers in local district council markets is in whole or processed flour form. Finally, middlemen normally sell directly to consumers except, when commissioned they may also sell to ADMARC.

Contribution of private traders

Although statements of marketing board objectives give the impression they are monopsonists in maize marketing, the record suggests otherwise. There is evidence that ADMARC has often handled a small proportion of the traded maize surplus--6% in 1970, 26% in 1973, and 13% in 1975 (Malawi Statistical Yearbook; 1973, 1977, and 1978). The rest has been handled by private traders in various market places; including farmgate, local markets, district council markets, and urban markets. In addition, a 1982 Ministry of Agriculture survey indicates that some of the numerous markets at which ADMARC operated were shared by private traders and that there were other markets at which only private traders operated. Areas in which only ADMARC was supposed to operate were typically remote districts far from highly populated urban centres (i.e., Chitipa and Nsanje), or districts specialising in cash crops rather than maize (i.e., Nkhata Bay, Karonga, Nkhotakota, Kasungu, and Salima). In 10 of the remaining 17 districts, markets at which only private traders or both ADMARC and private traders operated, they were in the majority (Quinten and Sterkenburg, 1975). Although some private traders were licensed to buy from smallholders and sell to ADMARC, most operated independently to supply their own customers.

Two reasons account for the high proportion of private maize trade. First, ADMARC sets both producer and consumer prices before the planting season and any produce sold to them is at the producer price. If producers

Figure 1. Official and unofficial maize marketing subsystems in Malawi.



sell directly to consumers, either as grain or flour, they can avoid selling at official consumer prices since the latter do not apply to the small measuring instruments used in local markets. Second, consumers prefer buying directly from farmers because the latter mainly stock local varieties while ADMARC mostly handles hybrids. Local varieties are favoured over hybrids because of their superior taste, poundability, and storage ease.

Table 1, which depicts differences in prices between the official and unofficial trade, shows that although the absolute gap between free market and official consumer price has widened over time, but there has been little trend in the ratio of the two prices (averaging around 1.25). Only recently has the ratio widened considerably. Until 1987, private trade was only permitted in small quantities. Thus, the large volume of private trade implies that many individuals have been actively involved.

## EMERGING PROBLEMS IN MAIZE PRICE AND MARKETING POLICY

Government controls ARDMARC's farm maize purchase price, domestic selling price, input prices, and export and import quantities. Thus, the government has used the marketing corporation as its principal instrument for influencing agricultural price and storage policies.

### Price policy objectives

The most commonly stated objectives of Malawi's maize producer price policy have been to: (a) provide incentives for smallholders to produce enough maize to meet domestic demand (i.e., to maintain maize self-sufficiency); (b) guarantee a steady cash income for smallholder farmers who comprise 85% of the population; (c) help implement the government's policy of diversifying agricultural production; (d) maintain an adequate return to ADMARC's operations (i.e., to keep costs somewhat in line with revenues which implies producer prices must respond to export parity prices, domestic selling prices, and ADMARC's operating costs); and (e) never reduce nominal maize prices.

On the other hand, the stated objectives of maize consumer price policy have been to: (i) enable wage earners to consistently purchase enough maize for a calorie-adequate diet and (ii) maintain an adequate return to ADMARC's operations (i.e., to keep revenues in line with costs which implies selling prices must respond to import parity prices, farm purchase prices, and ADMARC's operating costs). Although unstated, we assume that a third objective, comparable to enabling wage earners to purchase a calorie-adequate diet, might be necessary: (iii) discourage consumers from wishing to purchase no more than what is domestically available (i.e., maintaining maize self-sufficiency).

In addition, government--through ADMARC--would like to maintain a strategic maize reserve, sufficient to satisfy demand in low production years without resorting much to imports. The silos complex built in 1981 to house the strategic maize reserve holds 180,000 mt. Although, an optimal reserve level has not been identified, it would clearly depend upon the domestic buying and selling prices that prevail (Buccola and Sukume, 1988). The best strategic reserve must be high enough to avoid excessively large imports in lean years and small enough to avoid excessively large storage costs.

**Conflicts among objectives**[2]

No price or stock policy can completely satisfy all these objectives because they usually conflict with one another. Producer price policy intentions themselves can be self-conflicting. For example, stabilising cash incomes (b) requires averaging out export parity prices over a number of years. But current or averaged export parity prices may be too low to induce maize self-sufficiency (a), or the prices may be so high that the country becomes a consistent maize exporter. This in turn may conflict with the diversification objective (c). Any one of objectives (a) through (d) may from time to time require reductions in nominal prices, a violation of objective (e).

Similar conflicts may occur among consumer price policy objectives. Consumer prices sufficient for a universally calorie-adequate diet (i) are often lower than those needed to maintain acceptable ADMARC operating revenue (ii), and perhaps too low to keep average domestic consumption below average domestic production (iii). Finally, consumer prices adequate for objective (i) may collectively be inconsistent with objectives (d) and (ii) (i.e., they may not generate an adequate return to ADMARC's operations).

Faced with these dilemmas, it is no wonder that maize price policies have undergone several changes through the years. For example, it was often argued that low producer prices in the 1960s and 1970s were beneficial in that they discouraged farmers from selling so much of their crop at harvest, that they would have to buy some of it back later in the year. Yet, this reasoning is flawed because the seasonal pattern of producers' sales would depend upon expectations of seasonal price changes, not average annual prices.

**Declining ADMARC purchases**

As a result of the low price, ADMARC's domestic maize purchases in the 1960s and 1970s were rather small (Table 3). Many farmers may have sold

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[2]See appendix 1 for technical discussion of price administration.

**Table 3. ADMARC maize transactions, 1969 to 1986, Malawi.**

| | Farm purchases | | Domestic sales | | Foreign trade | |
|---|---|---|---|---|---|---|
| Year | Price(K/mt) | Quantity (000 mt) | Price(K/mt) | Quantity (000 mt) | Imports (000 mt) | Exports (000 mt) |
| 1969 | 20.00 | 85.83 | 40.00 | 127.05 | NA | 0 |
| 1970 | 20.00 | 54.03 | 40.00 | 59.48 | NA | 0 |
| 1971 | 30.00 | 36.42 | 40.00 | 51.65 | NA | 4.60 |
| 1972 | 30.00 | 37.01 | 40.00 | 34.00 | NA | 36.84 |
| 1973 | 30.00 | 64.59 | 40.00 | 50.29 | NA | 36.25 |
| 1974 | 30.00 | 60.12 | 50.00 | 90.76 | NA | 31.00 |
| 1975 | 40.00 | 65.53 | 66.00 | NA | NA | 0 |
| 1976 | 50.00 | 29.16 | 66.00 | NA | NA | 0 |
| 1977 | 50.00 | 65.11 | 66.00 | NA | NA | 0 |
| 1978 | 50.00 | 89.84 | 66.00 | NA | NA | 0 |
| 1979 | 50.00 | 120.30 | 90.00 | NA | NA | 0 |
| 1980 | 66.00 | 82.40 | 90.00 | 150.70 | 11.20 | 0 |
| 1981 | 66.00 | 91.21 | 110.00 | 121.40 | 56.10 | 0.05 |
| 1982 | 111.00 | 136.59 | 130.00 | 113.90 | 1.20 | 0.05 |
| 1983 | 111.00 | 246.09 | 140.00 | 74.80 | 0.05 | 76.09 |
| 1984 | 122.00 | 244.92 | 140.00 | 193.30 | 0 | 130.73 |
| 1985 | 122.00 | 296.44 | 140.00 | 85.70 | 0 | 45.66 |
| 1986 | 122.00 | 272.28 | 148.50 | 163.80 | 0 | 32.02 |

NA: indicates data not available.
Source: ADMARC, (various years) Malawi Government, Ministry of Finance, (1986)

their maize to small private traders or in local markets where the crop brought a better price than the one offered by ADMARC. This means the policy could not have been as effective as desired in discouraging food sales. In an effort to boost maize purchases and increase rural incomes, the government increased producer price for the 1982 marketing year by 66%. This had the desired effect of sharply increasing smallholder maize sales to ADMARC and of increasing stocks above those needed to fill the new silo complex. ADMARC's operating and financial performance was strong until 1978, but weakened near the end of the decade. By 1982, ADMARC was unable to finance fertilizer procurement for the smallholder sector. This downfall was largely a result of policies discussed below:

**Expansion into nonmarketing areas**

A major source of ADMARC's recent difficulties has been its expansion into fields unrelated to agricultural marketing, which has diverted financial and managerial energies from its principal line of work. The nonmarketing activities generally have brought low asset returns. Plans are underway to resolve this problem by requiring ADMARC to revert to its primary function of providing marketing services to the smallholder subsector; divest itself of its nonagricultural, nonmarketing investments; and rehabilitate its investments in agro-processing subsidiaries.

The move will require a legal change because the *Agricultural Development and Marketing Corporation Act of 1971* (Cap. 67.03) gave ADMARC the power to:

> Assist any organisation, government, corporation, company or co-operative society with capital or credit by means of investment in stock, shares, bonds, debentures or debenture stock, or with other ways or resources for the prosecution of any works, undertakings, projects, schemes or enterprises relating to the development or improvement of the economy of Malawi.

**Strategic maize reserve**

Until the government's 1981 decision to build a strategic grain reserve, ADMARC's farm maize purchases were usually roughly equal to domestic sales. The strategic maize reserve project was very costly. The capital cost of the silo complex was K15.9 million, requiring an annual interest payment of K1.0 million in 1985-86. A silo full of grain at 1986 purchase prices costs K22.0 million and does not bring any immediate return to ADMARC. Annual interest charge on the inventory value would, at a 15% interest rate, be K4.3 million. Finally, the annual maintenance cost is K420,000. All these costs are borne directly by ADMARC (Malawi Government, 1986).

ADMARC's problems have been aggravated by the large surplus stock it has held in addition to the strategic grain reserve. Substantial price increases since 1981 greatly increased ADMARC procurement, resulting in a surplus stock in excess of the 180,000 ton strategic reserve (Table 3). While it was possible to export surplus maize at attractive prices in the early 1980s due to adverse growing conditions in much of the surrounding region, surpluses in neighbouring countries are now depressing regional prices and making exports less profitable.

**Fertilizer subsidies**

ADMARC has subsidised farm inputs, such as seeds and fertilizer, by selling them at prices below the purchase price, plus transport and handling cost. The resulting losses show up on operating statements. For example, an important aspect of the Ministry of Agriculture's *National Rural Development Plan* is to encourage smallholders to fertilize maize (particularly composite and hybrid varieties) in order to increase yields; thereby releasing land for cash crop cultivation without violating the government's maize self-sufficiency objective. In addition, fertilizing smallholder cash crops such as tobacco and cotton would improve yields and gross margins. Because there is very little unused arable land in Malawi, the plan's success depended on convincing farmers to adopt hybrid maize. Only the hybrids respond well to fertilizer, so only they can raise yields sufficiently to release more land for foreign exchange-earning cash crops.

The policy successfully increased fertilizer use. Between 1972-73 and 1986-87, smallholder fertilizer purchases increased by 183%, from 23,750 to 67,290 mt. In addition, Kirchner and Kandoole (1986) found that the fertilizer subsidies succeeded in promoting fertilized hybrid maize as a cash crop, particularly on larger farms. However, the programme failed to encourage farmers to substitute local maize (planted for subsistence), for hybrid. Therefore, it failed to release additional land for cultivating nonmaize cash crops.

Promoting hybrid maize as a subsistence crop appears to have failed for at least two reasons. First, hybrid has different pounding and taste characteristics than local maize and is more difficult to store without losses. Therefore, there exists a consumer preference for traditional maize varieties. Second, substantial maize producer price increases made maize a highly profitable cash crop. Farmers responded to the increased price incentives by producing more maize for sale. As a cash crop, hybrid maize has impeded the expansion of the other crops that the diversification efforts were designed to promote. Since hybrid maize is more responsive to fertilizer than are tobacco, cotton, and groundnuts, Kirchner and Kandoole

(1986) argue that removing the fertilizer subsidy will actually promote the government's diversification objective.

## MARKET LIBERALISATION

The new *Agriculture (General Purpose) Act of 1987* essentially eliminates ADMARC's quasi-monopsony in the domestic market. It allows individuals in the private sector to deal in produce at 1,139 markets throughout the country, some of which formerly were only operated by ADMARC. The new arrangement differs from the past in that traders are now allowed to buy and sell any quantities they wish. Important features of the liberalised marketing plan are:

- Private traders must be licensed annually to operate in specified markets. This provision may be used to bar unethical traders, but possibly could also be employed to limit competition for ADMARC at certain times and places.
- Only Malawi nationals or businesses owned by Malawian citizens are eligible for licenses. This effectively controls operator size and reduces the possibility of market domination by a few foreign firms.
- Minimum producer prices will be announced annually and ADMARC will be a ready buyer at these prices. ADMARC's role will be limited to operating a buffer stock to maintain long-run producer price stability.
- Maize exports will be controlled through an export licensing system. To ensure food self-sufficiency, the government will monitor private traders' food exports. During periods of scarcity, it may be difficult for some traders to obtain export licenses.
- Traders must submit monthly statements detailing prices paid and received and amounts bought and sold.

**Likely aggregate effects**

One advantage of a move to private trading is that it will tend to stabilize incomes rather than prices. Under the government's price policy, pre-planting prices are paid, irrespective of actual harvest size. Thus, farm incomes have changed in proportion to harvest volumes. Under a freer market, prices will tend to be high with poor harvests and low in good years, an income stabilizing factor. Moreover, private traders tend to buy and hold when maize is plentiful and release stocks during seasons of scarcity, smoothing out interseasonal variability in stocks and scarcity prices. This may not work well in all years. Some argue that private traders presently are holding "excessive" stocks at the same time that ADMARC has imported maize from its neighbours. Traders' exact holdings are unknown and the

wisdom of their collective actions is still to be tested. Possibly, traders are undergoing a learning period.

The government will be able to affect ADMARC's participation in maize markets through changes in its guaranteed minimum produce price. As long as the minimum price stays relatively low, ADMARC will make maize purchases only in high production years when free market prices are low and close to the ADMARC price. Hopefully, increased competition with ADMARC will drive down marketing costs, as traders seek to reduce unnecessary expenditures in their search for higher income. In the long run, this should increase real producer prices.

At the same time, factors which we have thus far held constant will also change. First, fertilizer prices will increase with the four-year subsidy phase-out. This will reduce fertilizer purchases and hence maize yields, reducing quantities that farmers offer traders at any given producer price. Yield reductions will likely encourage farmers to switch to less fertilizer-responsive crops such as groundnuts, further reducing maize supply. Liberalisation-related maize price increases may be viewed as dampening this supply reduction effect to some extent.

Second, government is also legalizing private trade in groundnuts, pulses, and other nonmaize foods. If liberalisation increases long-run producer prices for these commodities as well, the net effect on maize-nonmaize price ratios will be uncertain. For example, the effect would depend on the degree of trader competition in maize, relative to nonmaize products. The long-run effects of liberalisation on consumer maize-nonmaize price ratios are similarly difficult to predict *a priori*.

### Likely disaggregated effects

Together, these observations suggest market liberalisation will promote long-run food security--provided government maintains adequate minimum producer prices. Liberalisation implies a long term reduction in government subsidies to the food sector, which will free resources for other productive enterprises. However, reducing subsidies will hurt poor consumers and farmers with inadequate resources to respond to the new incentives created by liberalisation. Thus, there is a need to investigate the welfare impacts of these policies. One approach is to develop profiles of smallholders who are most nutritionally at risk and to investigate likely short and long-run effects of liberalisation on these farmers. Some salient characteristics of smallholders that will serve as a background for such a study are discussed below.

A Ministry of Agriculture survey (1985) indicated that 23% of the sampled rural households had landholdings of less than 0.5 ha. (Table 4).

**Table 4. Distribution of smallholder farm size and related descriptors, 1985, Malawi.**

| | Holding size category (Hectares) | | | | | | |
|---|---|---|---|---|---|---|---|
| | 0.0-0.5 | 0.5-1.0 | 1.0-1.5 | 1.5-2.0 | 2.0-2.5 | 2.5-3.0 | Above 3.0 |
| Basic Data | | | | | | | |
| Share of all holdings (%) | 23.0 | 32.3 | 19.9 | 10.9 | 6.3 | 3.5 | 4.2 |
| Share of total cultivated area (%) | 6.2 | 20.9 | 21.3 | 16.3 | 12.2 | 8.3 | 14.8 |
| Mean holding size (hectares) | 0.3 | 0.7 | 1.2 | 1.7 | 2.2 | 2.7 | 4.0 |
| Mean family size | 3.5 | 4.3 | 4.8 | 5.0 | 5.6 | 6.0 | 6.3 |
| Household Income (K/hh)[a] | | | | | | | |
| Value of crop production | 53.30 | 130.50 | 225.70 | 308.30 | 405.14 | 482.47 | 733.22 |
| Livestock | 6.46 | 5.74 | 10.04 | 11.55 | 26.64 | 38.51 | 48.63 |
| Total from agriculture | 59.76 | 136.24 | 235.74 | 319.85 | 431.78 | 520.98 | 781.85 |
| Off-farm activities | 26.58 | 22.80 | 19.64 | 18.06 | 20.93 | 21.80 | 14.50 |
| Remittances | 4.79 | 6.32 | 7.66 | 5.21 | 6.95 | 5.96 | 8.68 |
| Total income | 91.13 | 165.36 | 263.04 | 343.12 | 459.66 | 548.74 | 805.03 |
| Agricultural Inputs | | | | | | | |
| Family labor (mandays) | 381 | 480 | 569 | 593 | 712 | 762 | 822 |
| Hired (mandays) | 8 | 12 | 20 | 25 | 42 | 58 | 94 |
| Total labor available[b] | 389 | 492 | 589 | 618 | 754 | 820 | 916 |
| Fertilizer use (kg/hh) | 6 | 12 | 33 | 59 | 87 | 114 | 146 |
| % receiving any extension service (%) | 13 | 18 | 28 | 41 | 38 | 52 | 47 |
| Food Balances | | | | | | | |
| Calorie requirement | 3715 | 4582 | 5138 | 5357 | 6062 | 6472 | 6878 |
| Food production | 899 | 2033 | 3356 | 4715 | 5987 | 7524 | 10997 |
| Calorie balance (absolute) | -2816 | -2549 | -1782 | -642 | -75 | 1052 | 4119 |
| Calorie balance (%) | -76 | -56 | -35 | -12 | -1 | 16 | 59 |

[a]kwacha/household. [b]kilograms/household

Source: Ministry of Agriculture (1985)

The average holding was just over 1.0 ha. Only 14% of the households had greater than 2.0 ha. this 14% operated about 35% of the cultivated land. The household income section of Table 4 shows that income from all farm sources rises with size of landholding. However, there is roughly an inverse relationship between off-farm income and farm size, suggesting that some individuals with small holdings may work for those with larger ones during part of the year. Average income of a household with more than 3.0 ha. is nine times that of someone with less than 0.5 ha., and five times that of someone with 0.5-1.0 ha. Households with smaller holdings also have less family and hired labour, use less fertilizer, and receive less frequent extension services than those with larger farms.

All these factors contribute to poor food balances for individuals with smaller farms, as shown by the food balances section of Table 4. Those with the smallest holdings have a 76% home-produced calorie balance deficiency; and this deficiency decreases with size of holding. Only households with more than 2.5 ha. (7.7% of those sampled) are net food sellers. These are the farmers who earn higher incomes when farm prices rise. The remainder (92.3%) are unlikely to benefit immediately since they will have to buy any supplementary food at higher prices. A crucial factor which this table does not explicitly show is the absolute ability of households to provide a calorie adequate diet out of home production and off-farm income. However, it is clear the government should target food assistance towards those with the smaller landholdings.

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# Appendix 1

# TECHNICAL DISCUSSION OF PRICE ADMINISTRATION

**A theory of administered producer prices**

Experience has shown that it is difficult to control maize prices intelligently, even if it were possible to enforce the controls in the face of extensive petty trading. The difficulty arises because prices are meant to satisfy two kinds of objectives. First, they are meant to influence quantities of maize produced, marketed, and consumed. Second, they are intended to affect the real incomes and risks faced by producers, middlemen, and consumers. it is not easy for government to know how such quantities and incomes should be distributed, let alone how a given set of prices will distribute them.

Consider, for example, the simple case where there are only quantity-type objectives. Government has a target maize quantity, $Q^o$, which it wishes to purchase in the next marketing year. The target may be determined as:

(1) $$Q^o = E(Q^d) + C[Var(Q^d), P^w] - S$$

where $E(Q^d)$ is the quantity consumers are expected to wish to purchase at the given selling price;

C is a safety margin (reflecting the variability of consumer demand and perhaps the wish to export some maize, itself a function of world price ($P^w$);

S is a carryover stock from the previous season.

In order to obtain $Q^o$ from farmers, a producer price $P^f$ must be paid that will induce farmers to sell $Q^o$. Ignoring risks, let the smallholder maize supply function be:

(2) $E(Q^S) = f(P^f, Z)$

where Z is the other factors (e.g. weather and groundnut prices) affecting supply.

Suppose now the maize demand function is:

(3) $E(Q^d) = h(P^S, X)$

where $P^S$ is maize consumer price and X represents other demand factors such as wages. Substituting (3) into (1), solving (2) for $P^f$, then substituting (1) into the inverted form of (2) gives:

(4) $P^f = f^{-1}(Q^o, Z) = f^{-1}[(h(p^S, X) + C - S), Z].$

That is, the desired producer price depends upon all the factors affecting domestic supply and demand (including the consumer selling price), world prices, and reserve stocks. A similar model can be developed to show the complexity of administering consumer prices.

**Producer price administration in practice**

A feeling for how the Malawi government has tackled this difficult problem can be had by regressing ADMARC producer and consumer prices against some of the factors shown in equation (4). Specifically, we used linear ordinary least squares to regress the following:

| Dependent Variable | Maize Producer Price | Maize Consumer Price |
|---|---|---|
| Independent Variables | ADMARC Stocks | ADMARC Stocks |
| | Maize Market Price | Maize Market Price |
| | Chicago Corn Price | Chicago Corn Price |
| | Consumer Price Index | Consumer Price Index |
| | Cotton Producer Price | Per Capita Monthly Wage |
| | Groundnut Producer Price | |
| | ADMARC Ammonium Sulfate Price | |

ADMARC stocks were closing stocks on March 31. Maize market prices were annual averages of those received by petty traders in local markets. Chicago corn prices were expressed in MWK/ton using official MWK/US $

exchange rates. The consumer price index (CPI) reflected low income market baskets in Blantyre. Ammonium sulfate price proxied for cash costs of production. Per capita monthly wages were for formal sector wage earners only. In this preliminary analysis, no accounting was taken of informal sector incomes, profits, or smallholder farm income. Annual averages of variables were utilised from 1970-71 to 1986-87.

The most striking relationship we found was between the CPI on the one hand and maize producer and consumer prices on the other hand. The correlation coefficient (r) between the CPI and each price was about 0.97, suggesting prices predominantly have responded to living costs. As one would expect, the CPI also was highly correlated with all the other Malawi prices and with wages. Consequently, the use of prices in undeflated form results in severe collinearity and obscures underlying relationships. We therefore deflated prices and wages with the CPI in subsequent analysis.

The only factors found significantly to have affected real ADMARC producer prices were domestic maize market prices and Chicago corn prices ($R^2$ was 0.35). Nonsignificance of cotton and groundnut producer prices was surprising because one would expect the maize producer price to be determined relatively to incentives provided for these other commodities. However, all domestic agricultural prices probably are determined simultaneously so the present single-equation specification is likely an oversimplification. The fertilizer price was nonsignificant, perhaps because the CPI already largely reflects annual changes in farm production costs (i.e., real fertilizer prices have not varied much until very recently). Hence, the hypothesis that producer prices have responded to farm production costs is not contradicted. Nonsignificant effect of ADMARC carryover stocks on producer prices may be the most surprising of all: one would think that when stocks are low, government would offer higher real producer prices (as ADMARC reports claimed happened in the early 1980s). Perhaps government has on average been unwilling to allow reserve stock instability to destabilise producer prices. This would be consistent with objectives (b) and (e), though in some cases it would work against objectives (a), (c) and (d) described on page 109.

Estimated elasticities of producer price with respect to the two statistically significant factors, domestic maize market price and Chicago price, were (at sample means) 0.38 and 0.25, respectively. This means, for example, that a 10.0% increase in the Chicago price has on average resulted in a 2.5% increase in ADMARC producer prices. Thus, maize producer price indeed has been stabilised relative to this particular measure of world price, a result one would expect given Malawi's relative geographic isolation and application of the price stabilisation objective.

**Consumer price administration in practice**

The only factor that significantly affected real ADMARC consumer prices was ADMARC stocks ($R^2$ was 0.12). Nonsignificance of real wages probably arises from the chance negative correlation between real wages and stocks. Nonsignificance of domestic maize market and Chicago corn prices may partly arise from colinearity, although we suspect it is owing also to government's strong emphasis on objective (i)--the consumer price stabilisation objective. ADMARC reserve stock levels do tend to be negatively related to the subsequent year's announced consumer price. Hence there has been some tendency for government to reduce large reserves by offering a consumption incentive or to discourage consumption in order to protect low reserves. But these effects have not been great. A 10.0% stock increase was associated with only a 0.5% reduction in consumer price, the t-value for the relationship being -1.44. The principal thing that can be said, in fact, about ADMARC's consumer maize price is that it has responded positively to living costs. Insensitivity of consumer prices to other supply and demand factors partly accounts for ADMARC's financial difficulties.

There has been no statistically significant autoregressive behaviour in Malawi's real producer or consumer maize prices. Thus, for instance, real maize prices have followed no cyclical pattern of a type that an autoregressive model could uncover. This suggests that when setting prices, the Malawi government at least has been aware of the information content of past real prices. Price instability that would arise from ignorance of this information apparently has been avoided. This does not necessarily imply that ADMARC prices have adequately incorporated nonmaize price information. Indeed, the nonsignificance of numerous nonmaize price variables in the above regressions suggests Malawi maize prices have not embodied all the information that they should have. It remains to be seen whether, given enough time, a liberalised market will perform better than the old controlled one.